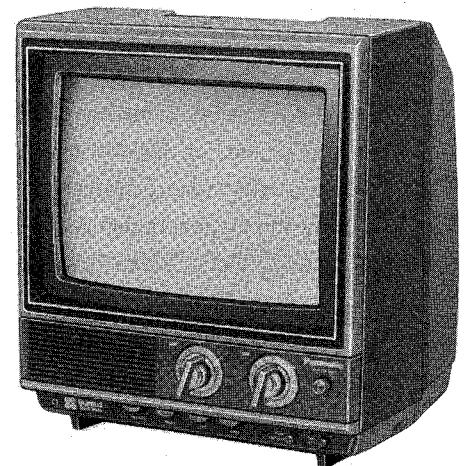


Service Manual

Color Television Monitor

CT-1110B**Chassis****No. NMX-K8A****Main Manual**

11240230 91004988 45
 BY-ET1110B
 SERVICE MANUAL PX



The service technician is required to read and follow the "Safety Precautions" and "Important Safety Notice" in this service manual.

Specifications

Power Input: 120 volts, 60 Hz, AC
 Power Consumption: 49 watts average 1.0 ampere max.
 Antenna Impedance: UHF 300 Ω Balanced
 VHF 300 Ω Balanced
 75 Ω Coaxial
 Receiving Channels: 2 - 13 (VHF), 14 - 83 (UHF)
 Intermediate
 Frequency: Video I-F carrier 45.75 MHz
 Sound I-F carrier 41.25 MHz
 Color sub carrier 42.17 MHz
 Semiconductors: 17 transistors
 35 diodes
 1 posistor
 Integrated Circuits: 5
 Anode Voltage: 24 kV $\pm$ 1 kV (Zero Beam Current)
 Sound Output: 1.0 watt (10 % Distortion)
 Speaker: 3 inches Round Type,
 Dynamic Voice Coil 16 Ω
 Q II-Lock: One button adjustment for Tint and Color

Automatic Circuit: Automatic Fine Tuning
 Peak Value AGC
 Automatic Voltage Regulator
 Automatic Beam Limiter
 Automatic Frequency and Phase Control
 Automatic Horizontal Frequency Control
 Automatic Degaussing
 Automatic Noise Canceller
 Automatic Color Control
 Picture Tube: 290KB22 52 square inches
 10 inches measured diagonally
 90° deflection Quinrix II, In-Line
 Dimensions: Height: 12- $\frac{3}{4}$ inches (325 mm)
 Width: 11- $\frac{1}{2}$ inches (290 mm)
 Depth: 13- $\frac{3}{4}$ inches (328 mm)
 Weight: 18- $\frac{1}{2}$ lbs. (8.3 kg)

Weight and dimensions shown are approximate.

Panasonic®

Specifications are subject to change without notice.

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THIS MODEL COMPLIES WITH DHHS RULES 21 CFR SUBCHAPTER J APPLICABLE AT DATE OF MANUFACTURE.

IMPORTANT SAFETY NOTICE

There are special components used in Panasonic TV sets which are important for safety. These parts are shaded on the schematic diagram and on the replacement parts list. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent X-RADIATION, shock, fire, or other hazards. Do not modify the original design without permission of Matsushita Electric.

ABBREVIATIONS USED IN THIS MANUAL

ABL	Automatic Beam Limiter
ACC	Automatic Color Control
AGC	Automatic Gain Control
AFT	Automatic Fine Tuning
APF	Active Power Filter
APC	Automatic Phase Control
AVR	Automatic Voltage Regulator

CRT	Cathode Ray Tube
DY	Deflection Yoke
FBT	Flyback Transformer
OTL	Output Transformerless
SEPP	Single-Ended Push-Pull Circuit
VIR	Vertical Interval Reference
ADDP	Automatic Deep Discharge Protection

SAFETY PRECAUTIONS

GENERAL GUIDELINES

1. It is advisable to insert an isolation transformer in the power line and AC supply before servicing a hot chassis.
2. When servicing, observe the original lead dress; especially the lead dress in the high voltage circuits. If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit.
3. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers, shields, and isolation R-C combinations, are properly installed.
4. Before turning the receiver on, measure the resistance between B+ line and chassis ground. Connect $\ominus$ side of an ohmmeter to the B+ lines, and $\oplus$ side to chassis ground. Each line should have more resistance than specified, as follows:

B+ Line	Minimum Resistance
130V	45k Ω
21V	5.6k Ω
20V	500 Ω
12V	400 Ω

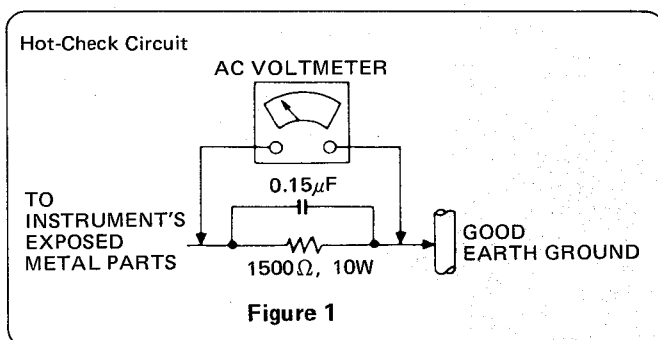
5. When the TV set is not to be used for a long period of time, unplug the power cord from the AC outlet.
6. Potentials, as high as 24.0 kV are present when this receiver is in operation. Operation of the receiver without the rear cover involves the danger of a shock hazard from the receiver power supply. Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high voltage equipment. Always discharge the anode of the picture tube to the receiver chassis before handling the tube.
7. After servicing make the following leakage current checks to prevent the customer from being exposed to shock hazards.

LEAKAGE CURRENT COLD CHECK

1. Unplug the AC cord and connect a jumper between the two prongs on the plug.
2. Turn on the receiver's power switch.
3. Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed metallic cabinet part on the receiver, such as screwheads, antennas, control shafts, handle bracket, etc. When the exposed metallic part has a return path to the chassis, the reading should be between 240 k Ω and 5.2 M Ω .
When the exposed metal does not have a return path to the chassis, the reading must be ∞ .

LEAKAGE CURRENT HOT CHECK (See figure 1.)

1. Plug the AC cord directly into the AC outlet. Do not use an isolation transformer for this check.
2. Connect a 1.5 k Ω , 10 watts resistor, in parallel with a 0.15 μ F capacitor, between each exposed metallic part on the set and a good earth ground such as a water pipe, as shown in figure 1.
3. Use an AC voltmeter, with 1000 ohms/volt or more sensitivity, to measure the potential across the resistor.
4. Check each exposed metallic part, and measure the voltage at each point.
5. Reverse the AC plug in the AC outlet and repeat each of the above measurements.
6. The potential at any point should not exceed 0.75 volts RMS. A leakage current tester (Simpson Model 229 or equivalent) may be used to make the hot checks, leakage current must not exceed 1/2 milliamp. In case a measurement is outside of the limits specified, there is a possibility of a shock hazard, and the receiver should be repaired and rechecked before it is returned to the customer.



X-RADIATION

WARNING: 1. The potential source of X-Radiation in TV sets is the High Voltage section and the picture tube.

2. When using a picture tube test jig for service, make sure that the jig is capable of handling 25.0 kV without causing X-Radiation.

NOTE: It is important to use an accurate, periodically calibrated high voltage meter.

1. Turn the Brightness control fully counterclockwise.
2. Set the SERVICE switch to SERVICE.
3. Measure the High Voltage. The upper meter (Electrostatic type) reading should indicate 24 kV, +1.0 kV, -1.0 kV. If the upper meter indication is out of tolerance, immediate service and correction is required to prevent the possibility of premature component failure.
4. To prevent an X-Radiation possibility, it is essential to use the specified picture tube.
5. To prevent exposure to X-Radiation, the picture tube shield must be kept in place with power applied to the set.

HORIZONTAL OSC. DISABLE CIRCUIT TEST

SERVICE WARNING: This test must be made as a final check before set is returned to customer.

1. With rear cover removed, supply nominal 120V AC to set and turn on power switch.
2. Adjust customer controls to normal position.
3. Short the collector and the emitter of Q801 with a jumper wire. Confirm that the picture tube screen blacks out (horizontal oscillation stops).
4. If this does not occur, Horizontal OSC. Disable Circuit is not operating.

Follow the Horizontal Oscillator Disable Circuit Repair Procedures before the set is returned to customer.

HORIZONTAL OSC. DISABLE CIRCUIT REPAIR PROCEDURE

- 1) Connect a DC voltmeter between the cathode of D510 and chassis ground of the main circuit board. If nearly 21V is not present on the cathode, find the cause. Check R515, D510 and C531.
- 2) Connect a DC voltmeter between the cathode of D504 and chassis ground of the main circuit board. If nearly 11.0V is not present on the cathode, find the cause. Check R535, R536 and D504.
- 3) Repeat step 2) procedure. If nearly 11.0V is present on the cathode, check IC401, R519, C515 and D503.
- 4) Carefully check above specified parts, and related circuits and parts. When the circuit is repaired, try the horizontal oscillator disable circuit test again.

C. WITH TEST EQUIPMENT

When measuring voltage with a VTVM, be sure to use the test points located on the conductor side of the circuit boards.

B+ VOLTAGE (+130V) ADJUSTMENT

1. Connect a voltmeter between TP91 and chassis ground.
2. Adjust R808 for $130V \pm 1.5V$.

HIGH VOLTAGE ADJUSTMENT

1. Adjust color temperature. (See page 7.)
2. Adjust Screen (R365), ABL (R310), Bright (R308) and Panabrite (R307) controls to zero beam.
3. Using a calibrated high voltage meter (electrostatic type), confirm that High Voltage is within a range of $+24.0 kV \pm 1.0 kV$.

NOTE: Be certain that B+ is $+130V \pm 1.5V$ with beam current at zero during the High Voltage Adjustment.

4. If the high voltage is out of tolerance, adjust R808 until the high voltage becomes within tolerance without getting B+ voltage to be out of tolerance.

COLOR PURITY ADJUSTMENT

(See figures 4, 6 and 7)

1. Operate the receiver for 20 min. with Bright control at maximum to warm up the CRT.
2. Degauss the receiver fully by using an external degaussing coil.
3. Roughly adjust convergence. (See page 7.)
4. Receive a black and white signal.
5. Turn red and blue Cut Off controls fully counterclockwise to obtain a green field. Adjust Drive controls if green field is not obtained.
6. Loosen the deflection yoke clamp screw and move the deflection yoke as close to the purity magnet as possible.
7. Loosen purity magnet clasper (See figure 7) and adjust the purity magnet to set the vertical green raster precisely at the center of the screen (See figure 4). Then tighten the clasper.
8. Slowly move the deflection yoke forward and adjust for the best overall green screen.
9. Tighten the deflection yoke clamp screw.
10. Produce the blue and red raster by Cut Off controls and observe that good purity is obtained on the respective field.
11. Observe that a uniform white raster is obtained by adjusting R, B, Cut Off controls. If screen is not uniformly white, repeat above procedure.

NOTE: Purity correction magnet may be effective to control purity slightly.

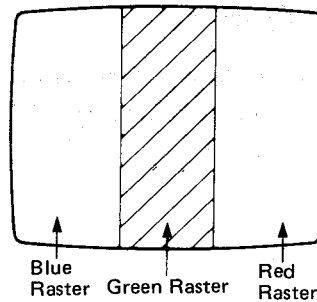


Figure 4

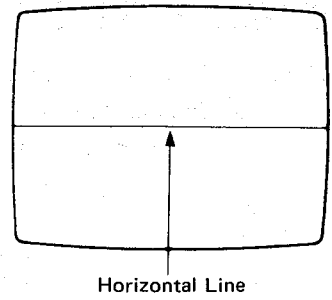


Figure 5

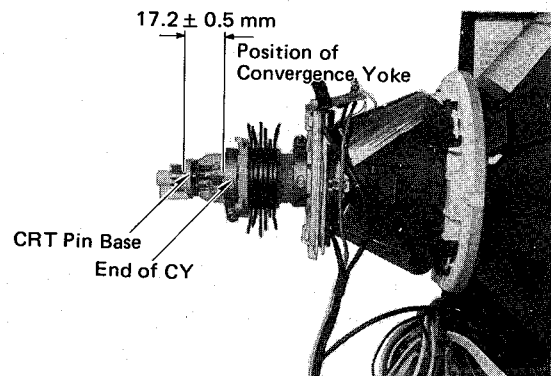


Figure 6

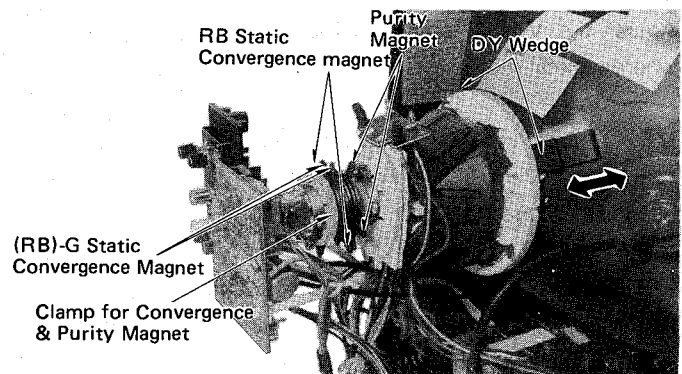


Figure 7

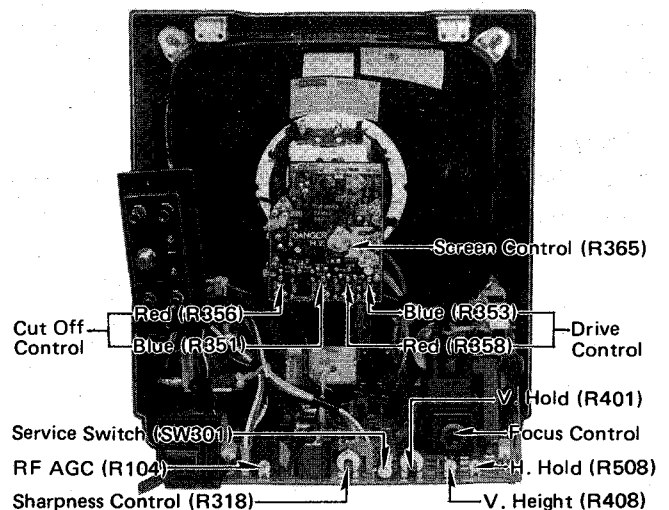


Figure 8

COLOR TEMPERATURE ADJUSTMENT

(See figures 5 and 8)

1. Tune in a black and white program.
2. Turn Color control fully counterclockwise and QII-Lock Switch to the OFF position.
3. Set Bright and Panabrite controls to minimum position.
4. Set Service Switch to SERVICE position.
5. Turn the two Cut Off controls (R, B on C-Board) fully counterclockwise.
6. Turn the Screen control (R365) fully counterclockwise.
7. Connect VTVM between TP47G on C-Board and chassis ground.
8. Adjust ABL control (R310) and Bright control to obtain a VTVM reading of $120V \pm 1V$.
9. Slowly turn the Screen control clockwise until the slight green horizontal line appears on the picture tube.
10. Make the horizontal line white by turning the two Cut Off controls which were previously set fully counterclockwise at step (5).
11. Return the SERVICE switch to NORMAL position.
12. Alternately adjust the Red and Blue Drive controls to produce a normal black and white picture. Check the black and white picture detail for proper black and white rendition (no coloration) from lowlights to highlights and at all brightness levels for proper tracking. Proper tracking at all brightness levels can be obtained when the Screen control, Cut Off controls, and Drive controls are properly adjusted. If the results are unsatisfactory, repeat all the above steps.

CONVERGENCE ADJUSTMENT

NOTE: Before adjusting convergence, vertical height, linearity and focus adjustments must be completed.

1. Connect a dot pattern generator to the set.
2. The brightness level should be no higher than necessary to obtain a clear pattern.
3. Loosen the convergence magnet clamp and converge the red and blue dots at the center of the screen, by rotating the R-B Static Convergence Magnet. (See figure 7)
4. Align the converged red/blue dots with the green dots at the center of the screen, by rotating the (RB)-G Static Convergence Magnet. (See figure 7)

5. Tighten the convergence magnet clamp.
6. Remove the DY wedges (See figure 7) and slightly tilt (do not rotate) the deflection yoke horizontally and vertically to obtain good overall convergence.
7. Secure the deflection yoke by reinserting the wedges. (See figure 9)
8. If purity error is found, repeat the purity adjustments.

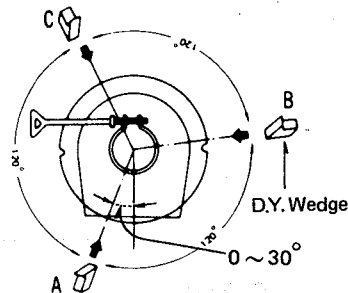


Figure 9

NOTE:

1. Wedge A shown in figure 9 should be fixed within a range of $0^\circ \sim 30^\circ$ to the left of the vertical line as shown.
2. After inserting wedge A, insert wedges B and C. The wedges should be set 120° apart from each other.
3. Be certain that the three wedges are firmly fixed and the Deflection Yoke is tightly clamped in place. Otherwise the Deflection Yoke may shift its position and cause a loss of convergence and purity.

ABL CONTROL ADJUSTMENT

This is factory aligned. Usually no further alignment is required in the field. However, when the A-Board, C-Board or CRT is replaced, the following alignment is necessary:

1. Connect a jumper lead between TP14 and GND.
2. Tune in a better air signal.
3. Turn Bright (R308) and Panabrite (R307) controls fully clockwise.
4. Connect the DC voltmeter between TP85 and TP86 (positive lead of the voltmeter to TP85 and negative lead to TP86).
5. Adjust the ABL control (R310) to obtain a voltmeter reading of approximately 12.5V to obtain proper picture brightness.

GENERAL ALIGNMENT

VIDEO I-F ALIGNMENT

Preparation

1. Set up sweep and marker generator, oscilloscope, and power supply as shown in figure 10.
2. Rotate the VHF channel selector knob and set the channel at high position.
3. Set up AGC Bias control ($5k\Omega$) as shown in figure 10.
4. Connect R-jumper (100Ω) in parallel with R110.

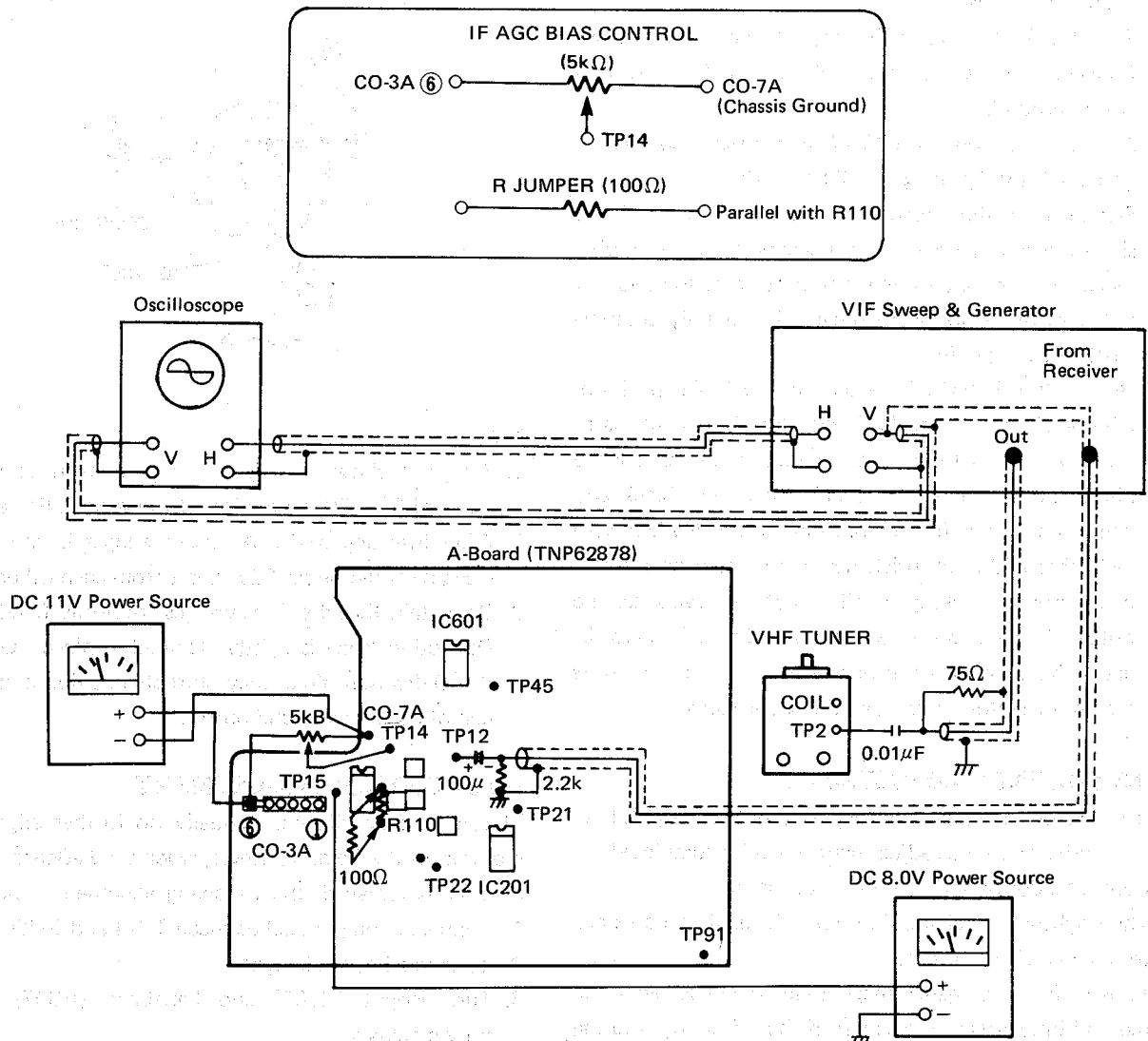


Figure 10

Alignment Procedure

1. Set the sweep generator output level to 100mVp-p.
2. Adjust the bias voltage at TP14 for maximum signal gain. Then increase the bias voltage to decrease the detector output voltage at TP12 until it becomes 1.0Vp-p on oscilloscope.
3. Adjust tuner converter coil to achieve a waveform as that of figure 11, with maximum amplitude at 44 MHz.
4. Make sure that there is no spurious oscillation by varying sweep output by ± 15 dB adjusting IF AGC bias control.

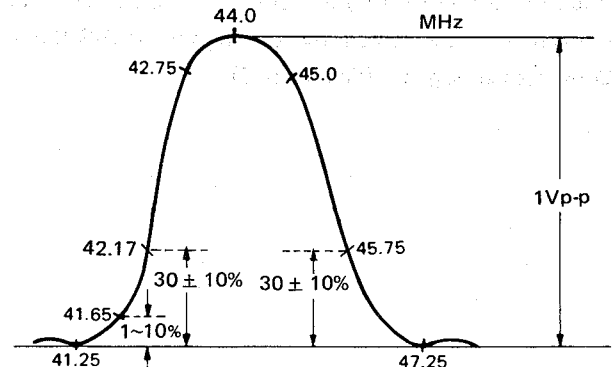


Figure 11

45.75 MHz TUNING TRANSFORMER ALIGNMENT

Preparation

1. Set up sweep and marker generator, oscilloscope and power supply as shown in figure 12.
2. Set up AGC Bias control (5k Ω) as shown in figure 12.

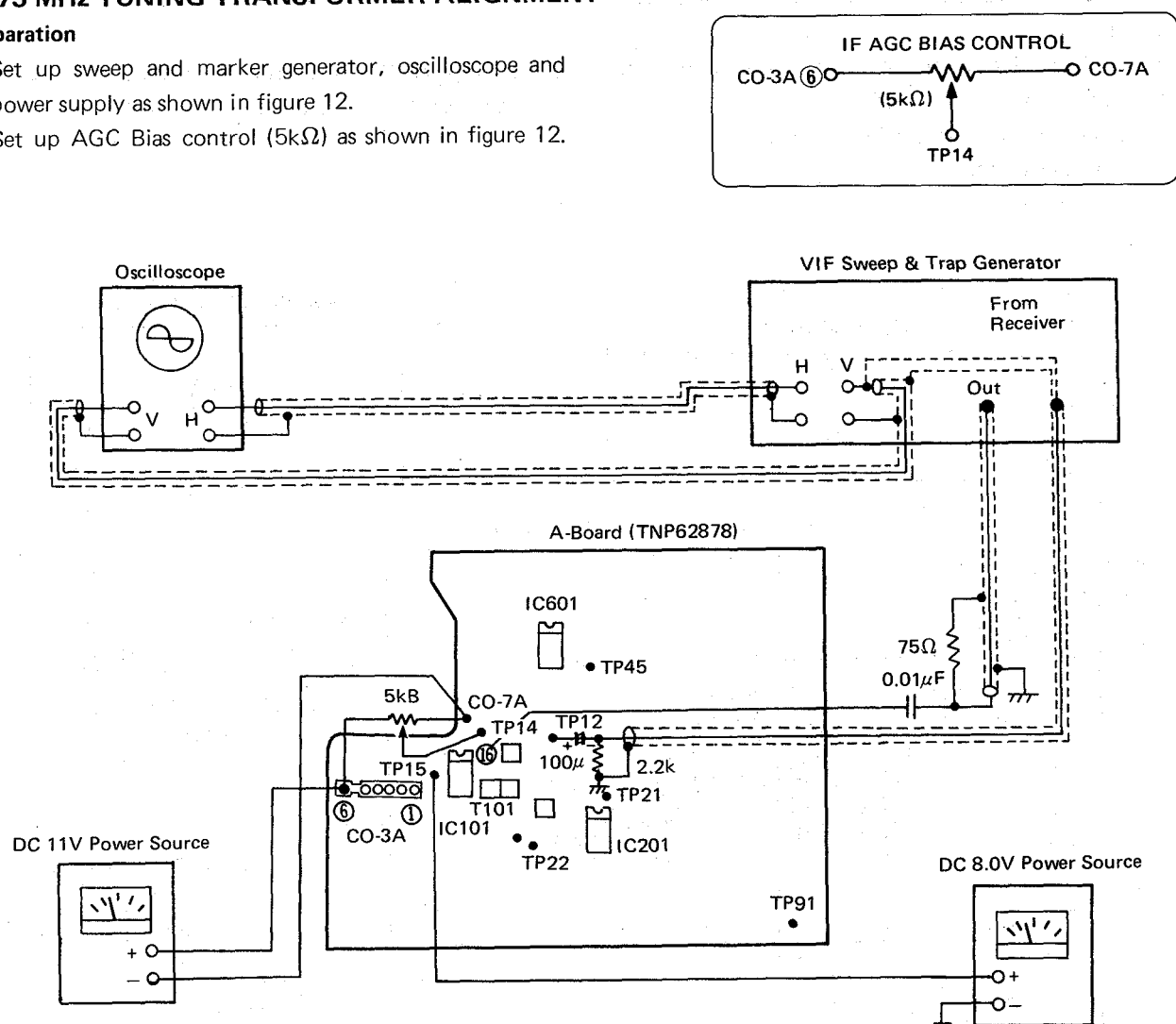


Figure 12

Alignment Procedure

1. Set the sweep output level to 100mVp-p.
2. Adjust the IF-AGC Bias control (5k Ω) to achieve a Detector output voltage of 200mVp-p on oscilloscope.
3. Adjust T101 for maximum wave amplitude at 45.75 MHz. (See figure 13)

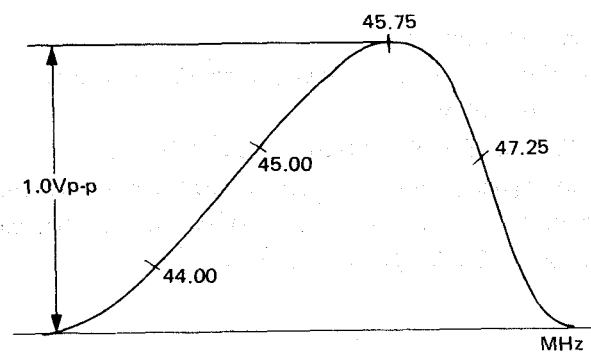


Figure 13

AUTOMATIC FINE TUNING (AFT) ALIGNMENT

Preparation

1. Set up 45.75 MHz signal generator, power supply and voltmeter as shown in figure 14.
2. Rotate the channel selector knob and set the channel at VHF high position.
3. Set up IF-AGC Bias control ($5k\Omega$) as shown in figure 14, and adjust it to approximately 6.5V.

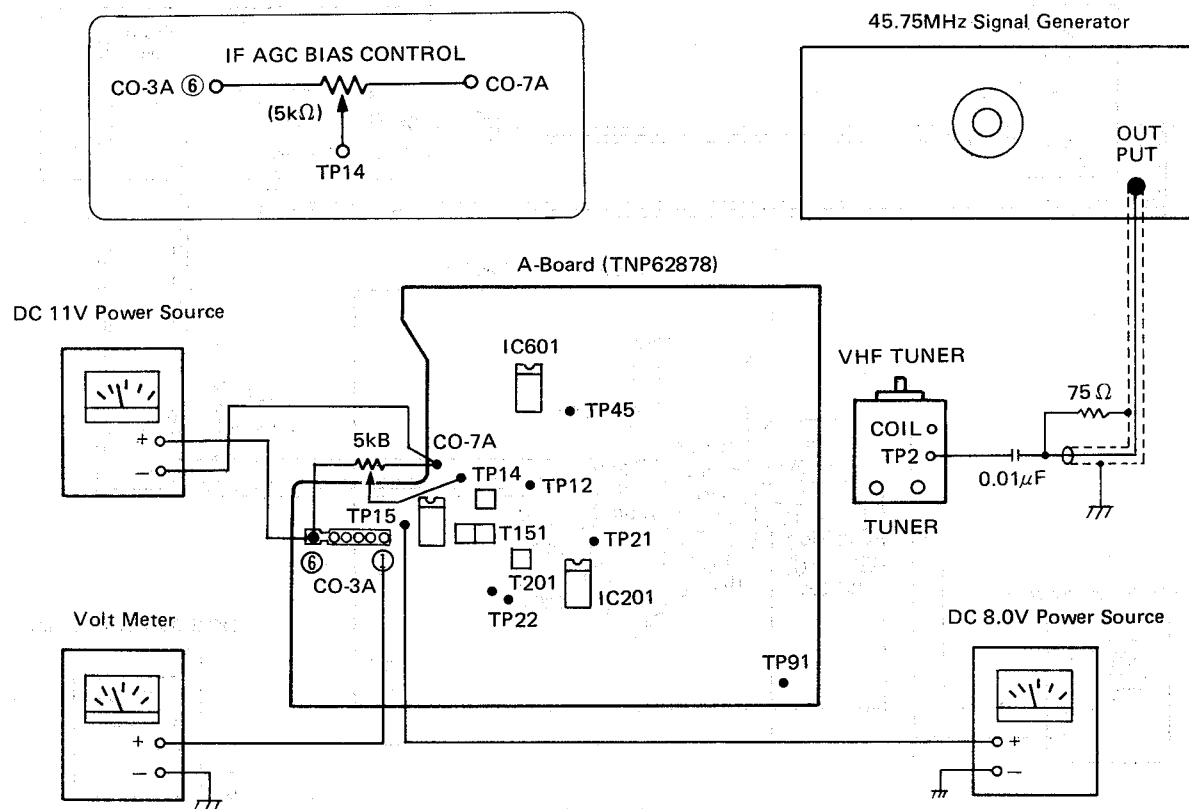


Figure 14

Alignment Procedure

1. Set signal generator frequency at 45.75 MHz and output level to 100mVp-p.
2. Adjust T151 to obtain $6.5V \pm 1.0V$ at CO-3A ①.
3. Vary signal generator frequency 100 kHz higher and lower (45.65 MHz – 45.85 MHz) and confirm that the voltage at CO-3A ① varies more than 2V.

NOTE: This alignment is factory set and should require no adjustment. If adjustment should become necessary, use an accurate frequency counter to monitor the RF generator frequency.

SOUND I-F ALIGNMENT

Preparation

1. Set up sweep and marker generator, power supply and oscilloscope as shown in figure 15.

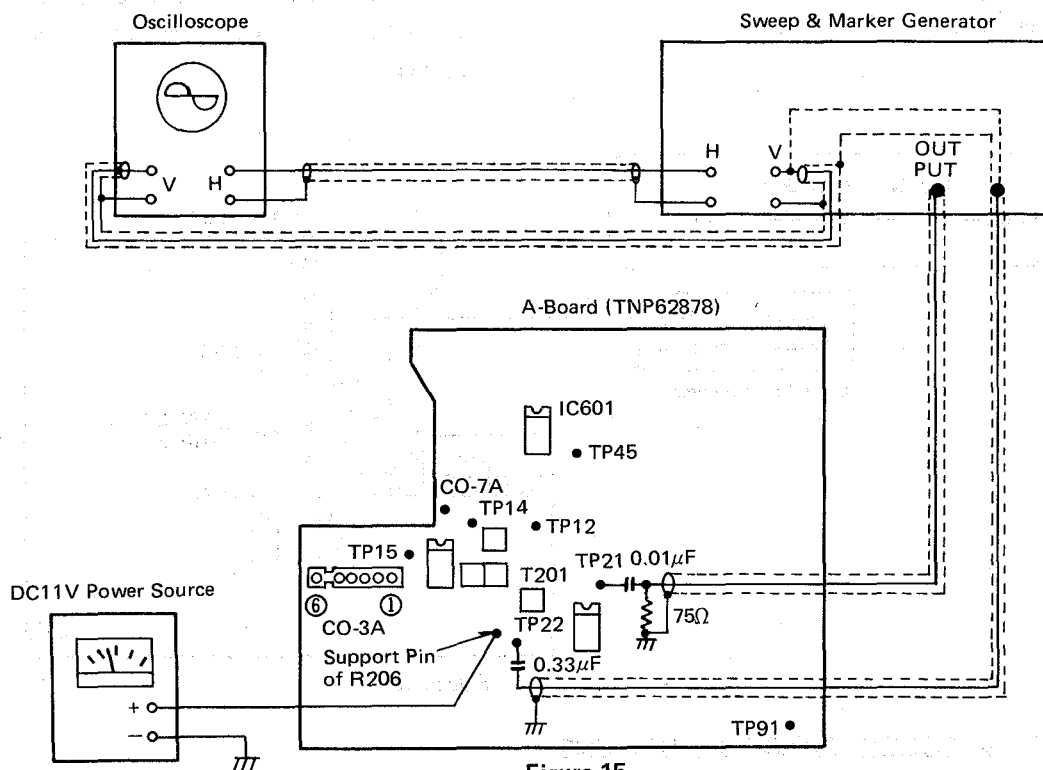


Figure 15

Alignment Procedure

1. Set sweep generator output level to 3mVr.m.s. and adjust T201 to achieve waveform as shown in figure 16.
2. Confirm that waveform line between +90 kHz and -90 kHz point is straight and shows more than 2.0Vp-p in amplitude.
(There should be no distortion in the range of ± 100 kHz.)

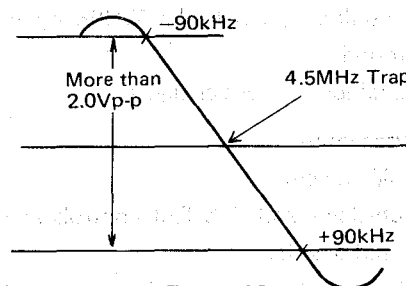


Figure 16

4.5 MHz TRAP ALIGNMENT

Preparation

1. Connect Oscilloscope between TP12 and chassis ground.
2. Tune in a rainbow color bar signal.

Alignment Procedure

1. Rotate the fine tuning knob to shift the local Osc. to

a higher frequency so that a waveform should be obtained as shown in figure 17.

2. Set T102 to minimize the amplitude of 4.5 MHz beat.
3. Rotate the fine tuning knob back and again tune in a rainbow color bar signal.

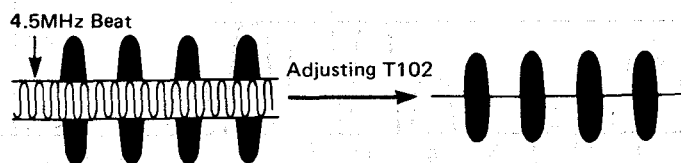


Figure 17

APC ALIGNMENT

Preparation

1. Connect the R-jumper (100k Ω) between TP45 and terminal ⑫ of IC601 as shown in figure 18.
2. Connect the digital multi-meter between ⑬ of IC601 and chassis ground.

Alignment Procedure

1. Tune in a rainbow color bar signal.
2. Measure the voltage of terminal ⑬ of IC601.
3. Then tune in a black and white signal.
4. Adjust the APC Control (R612) so that the reading of the multi-meter becomes equal to the voltage measured by step 2.

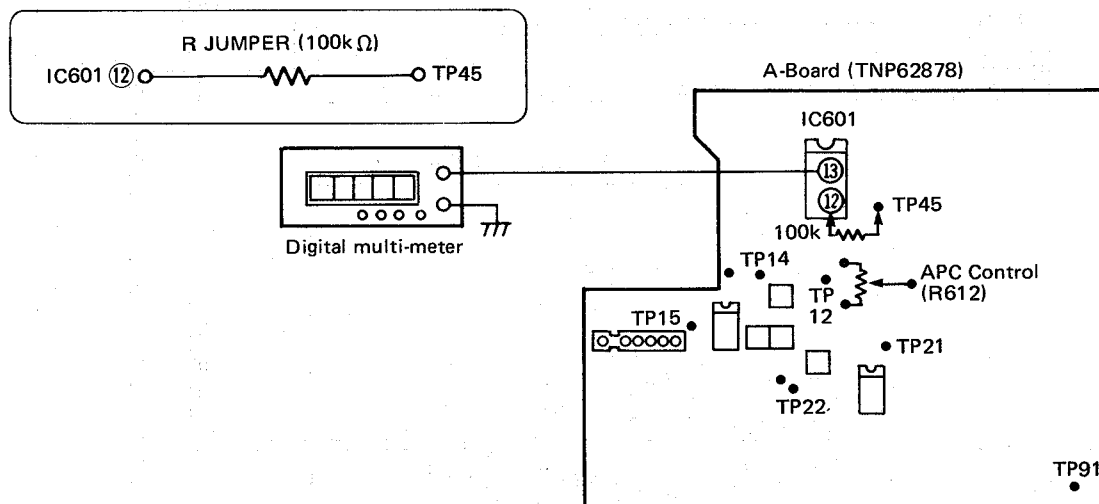


Figure 18

SUB-COLOR & COLOR PHASE ALIGNMENT

Preparation

1. Connect oscilloscope between TP46B on A-Board and chassis ground.
2. Tune in a rainbow color bar signal.

Alignment Procedure

1. Sub-Tint Alignment
 1. Set Sub-Color and Sub-Tint controls approximately in the mid-position.
 2. Set Color and Tint controls approximately in the mid-position.
 3. Adjust Tint control to the point where the color phase does not change with Q II-Lock Switch ON and OFF.
 4. Adjust Sub-Tint control to achieve the waveform as shown in figure 19.
5. Confirm that the color phase does not change with Q II-Lock ON and OFF. If it changes, repeat steps 3 and 4.
2. Sub-Color Alignment
 1. With the condition of Sub-Tint aligned and Q II-Lock Switch ON, set Color control at maximum position.
 2. Align Sub-Color control to achieve the wave voltage 1.4V as shown in figure 19.

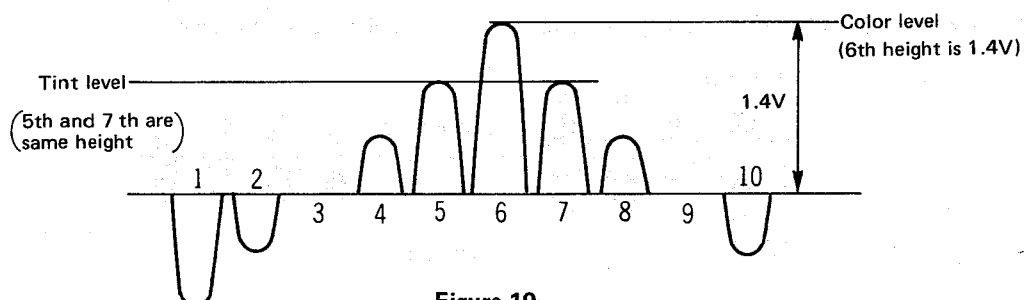


Figure 19

CIRCUIT EXPLANATION

HORIZONTAL OSC. DISABLE CIRCUIT

(See figure 20)

1. Under normal operation conditions, zener diode (D504) is Cut Off due to its low cathode voltage.

2. When the amplitude of the pulse applied to diode D510 increases, the cathode voltage of zener diode D504 rises, and D504 conducts.
3. The conduction of D504 increases the voltage at pin ⑤ of IC401. This causes the Horizontal Oscillator Circuit to stop and reduces the high voltage to zero.

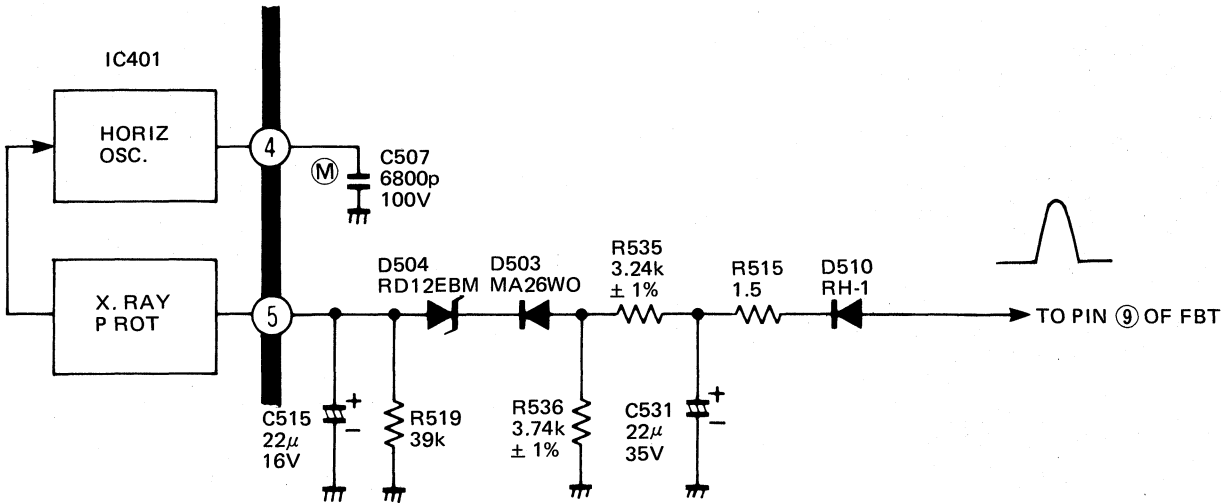
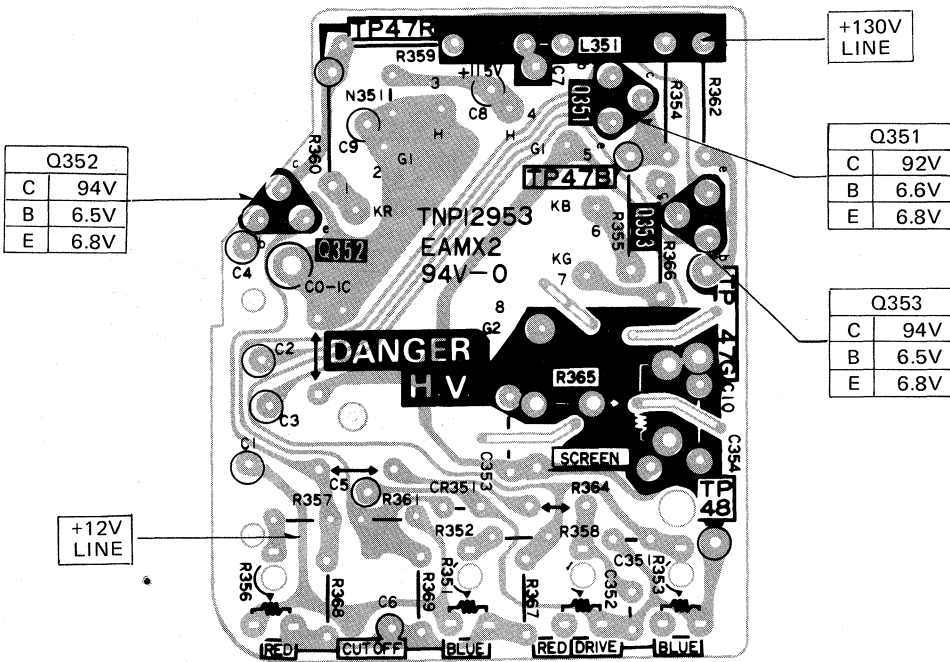


Figure 20

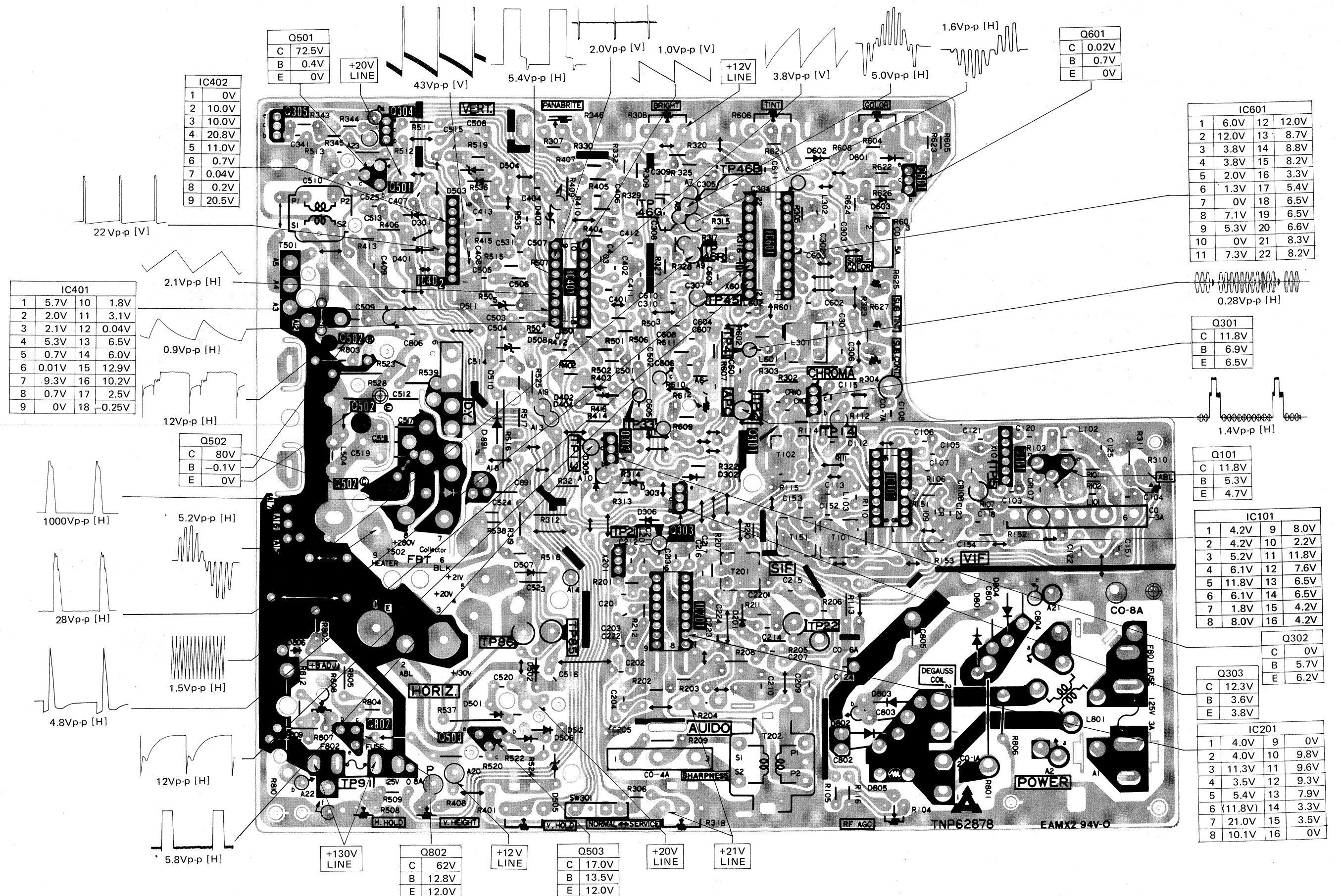
CONDUCTOR VIEWS

C-BOARD TNP12953ZA

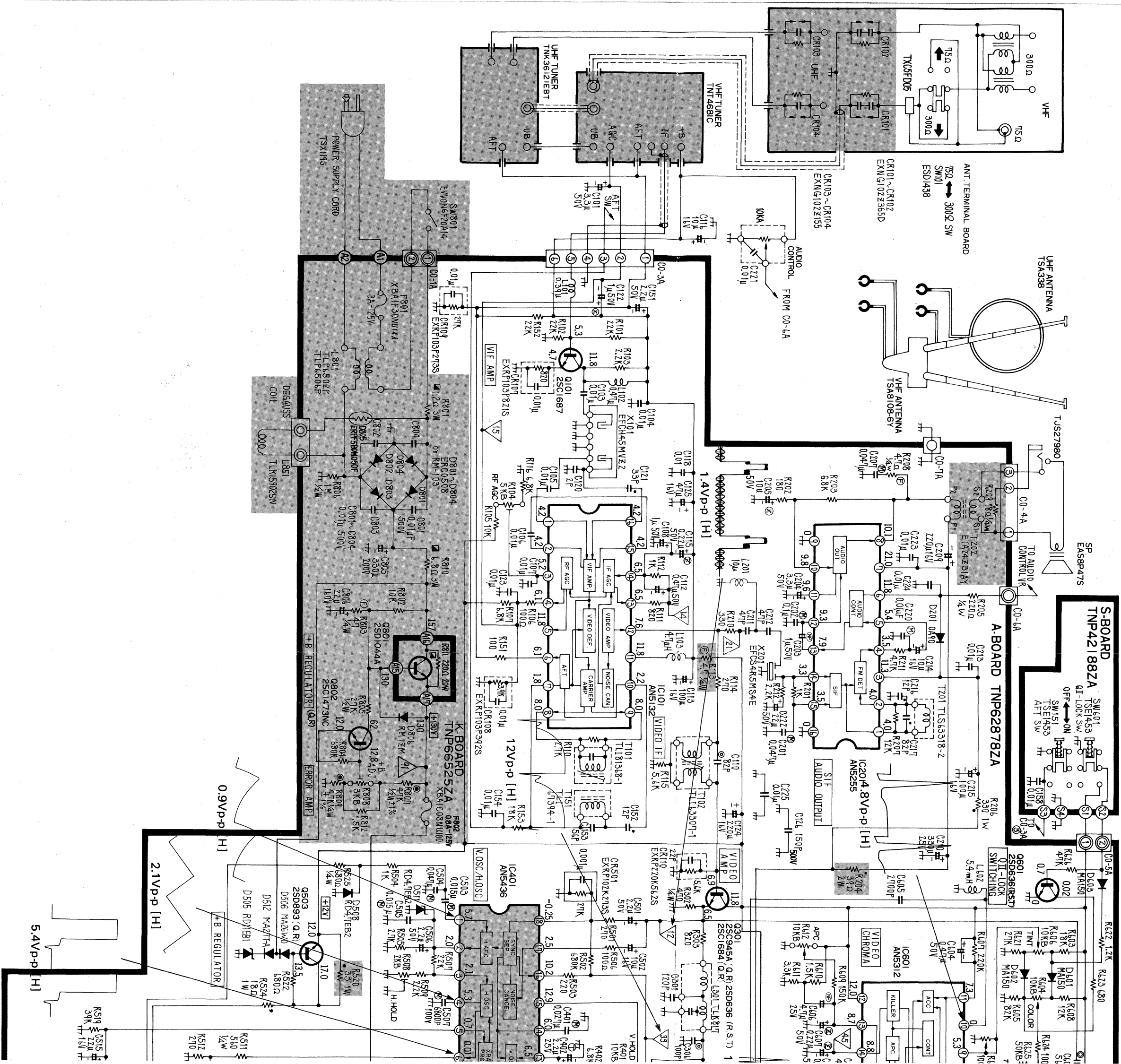


CT-1110B CT-1110B

A-BOARD TNP6287ZA



SCHEMATIC DIAGRAM FOR MODEL CT-1110B



IMPORTANT SAFETY NOTICE

THE SHADED AREA ON THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION, FIRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFACTURER'S SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SHADED AREAS OF THE SCHEMATIC.

NOTE:

1. RESISTOR

All resistors are carbon 1/8W resistor, unless otherwise noted the following marks.
Unit of resistance is OHM (Ω), (K = 1,000, M = 1,000,000).

- Δ : Solid
- $\square$: Wire Wound
- $\oplus$: Non-flammable
- $\otimes$: Thermistor
- $\bullet$: Fuse
- $\circ$: Metal Oxide
- $\blacksquare$: Cement
- $\odot$: Metal Film

2. CAPACITOR

All capacitors are ceramic 50V capacitor, unless otherwise noted the following marks.
Unit of capacitance is μF , unless otherwise noted.

- NP : Unit of Inductance
- P : Unit of Inductance
- I : Unit of Inductance
- I : Unit of Inductance
- I : Unit of Inductance

3. COIL

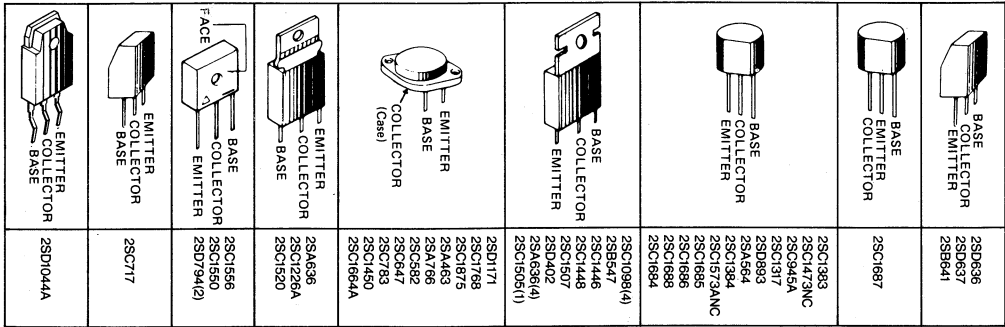
Unit of Inductance

4. TEST POINT

Unit of Inductance

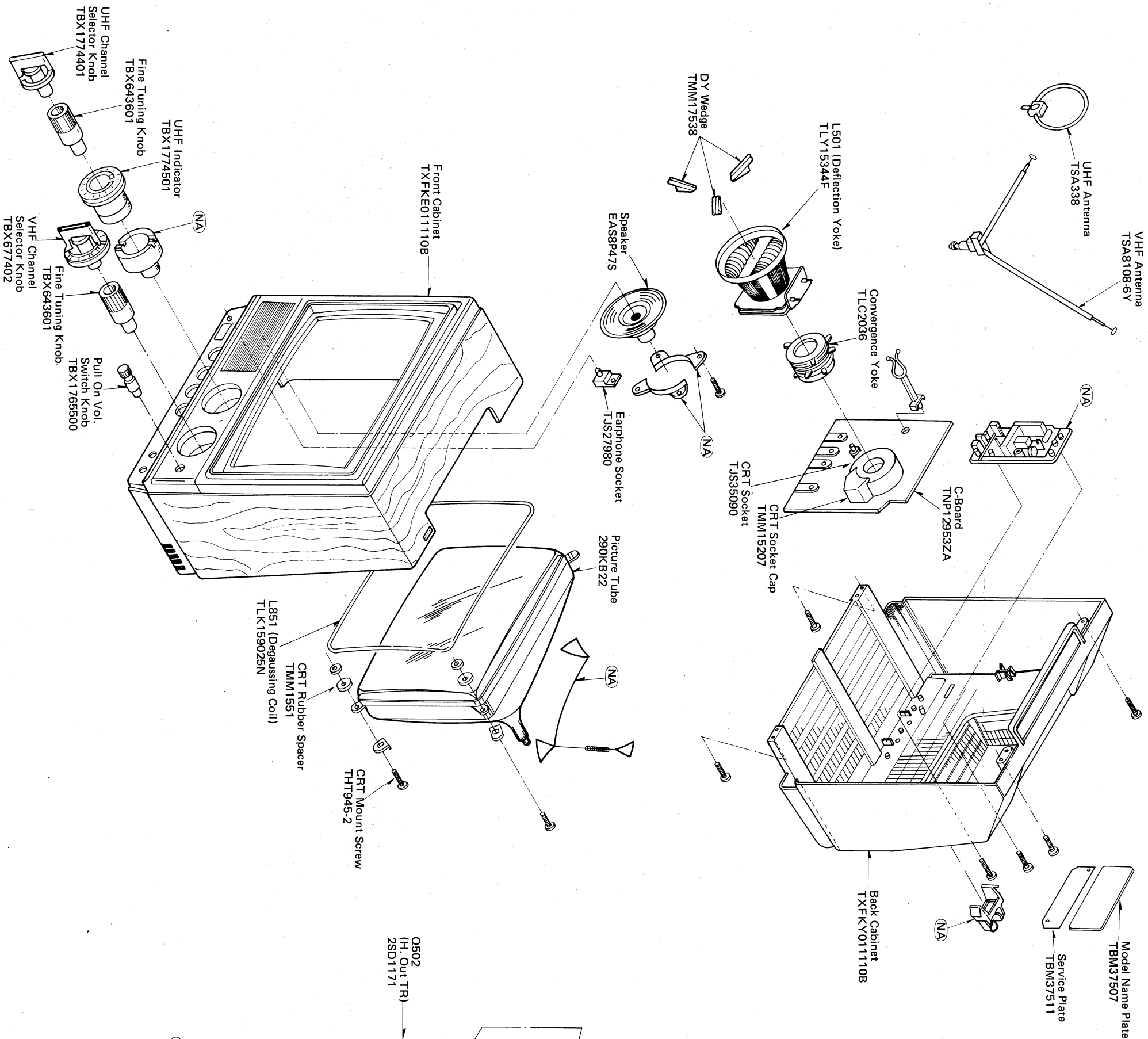
5. VOLTAGE

Unit of Inductance

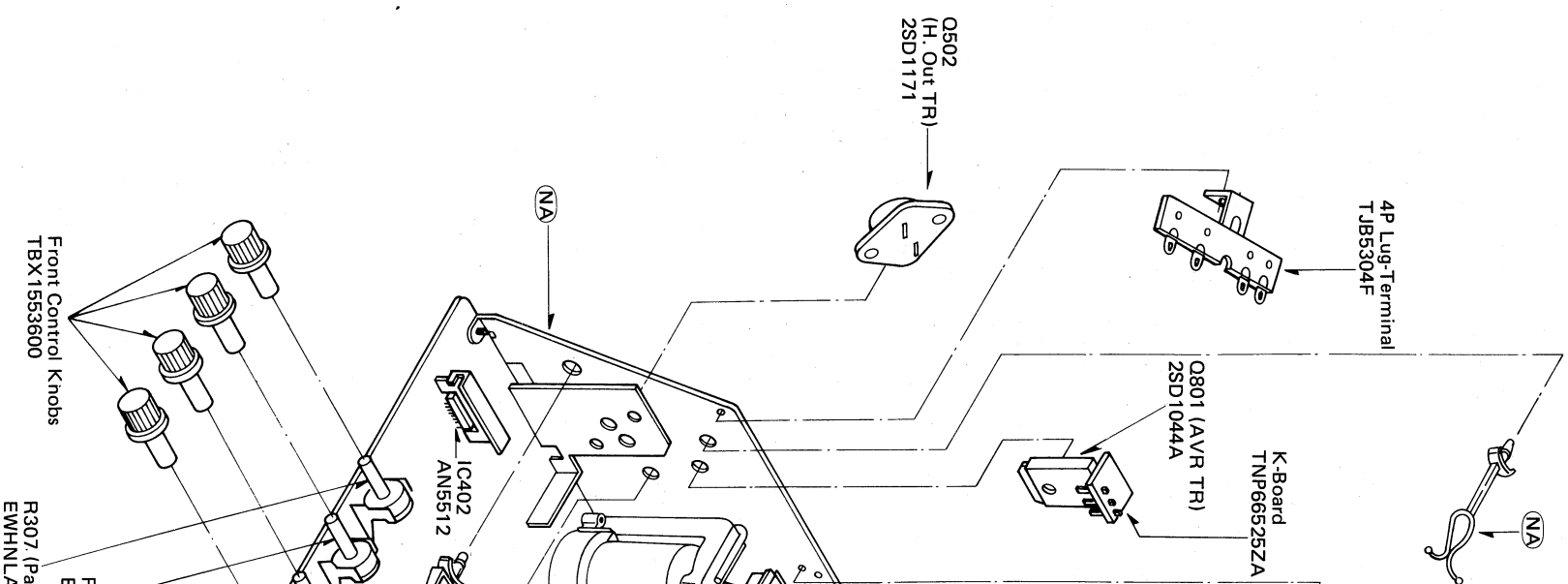


This schematic is the latest at the time of printing.

CABINET PARTS



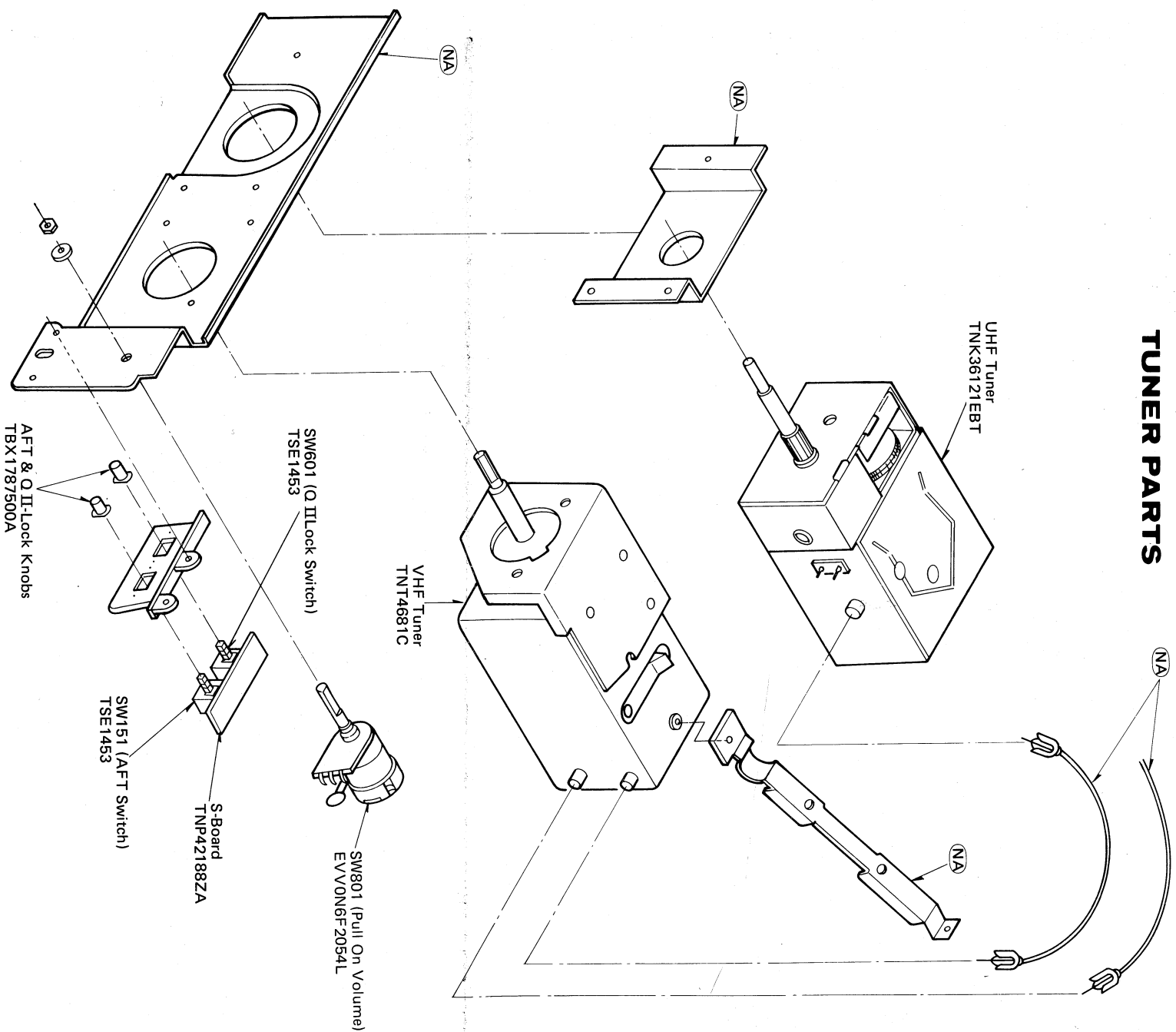
CHASSIS



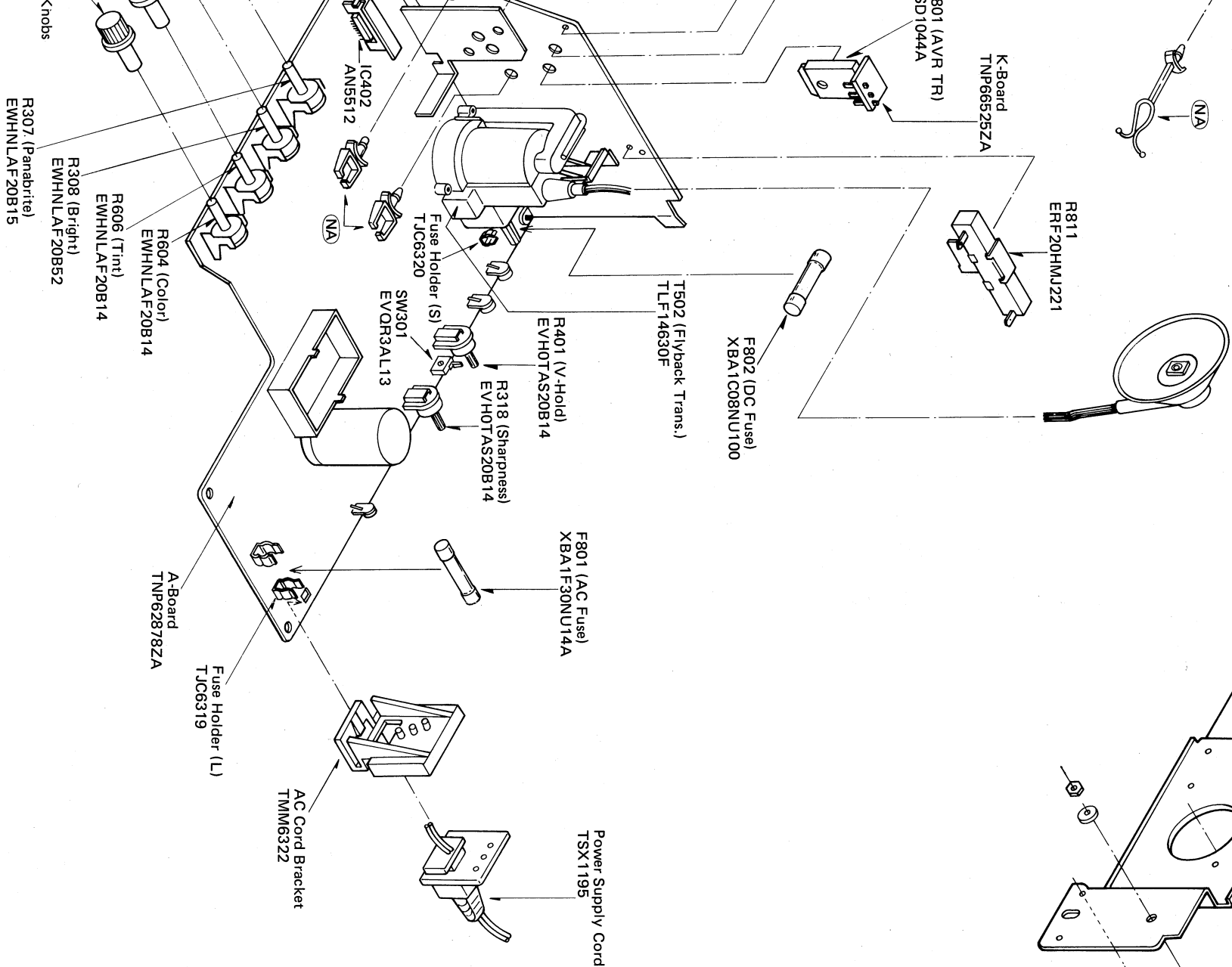
NOTE: Parts or Components marked with (NA) and
unlisted are not available as replacement parts.

EXPLODED VIEWS

TUNER PARTS



CHASSIS PARTS



ABBREVIATION OF PART NAME
AND DESCRIPTION

RESISTOR

PART NAME & DESCRIPTION			ALLOWANCE	
TYPE				
C	Carbon	F	± 1%	
F	Fuse	J	± 5%	
M	Metal Oxide	K	± 10%	
S	Solid	M	± 20%	
W	Wire Wound	G	± 2%	

Part No.

Example: ERD12TJ104

Description

Example: 100K 1/2W

CAPACITOR

PART NAME & DESCRIPTION			ALLOWANCE	
TYPE				
C	Ceramic	C	±0.25pF	
E	Electrolytic	D	±0.5pF	
P	Polyester	F	±1pF	
S	Styrol	J	±5%	
T	Tantalum	K	±10%	
V	Trimmer	L	±15%	
		M	±20%	
		P	+100%-0%	
		Z	+80%-20%	

Part No.

Example: ECKD1H103PF2

Description

Example: 0.01uF 50V

REPLACEMENT PARTS LIST

Important Safety Notice

Components identified by shaded area have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

Note: TNP62878ZA (A-Board), TNP12953ZA (C-Board), TNP66525ZA (K-Board) and TNP42188ZA (S-Board) are not available as a complete printed circuit board.

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
	RESISTORS				
R101	ERD10TJ223	C 22Kohm J 1/8W	R316	ERD10TJ391	C 390ohm J 1/8W
R102	ERD10TJ223	C 22Kohm J 1/8W	R317	ERD10TJ391	C 390ohm J 1/8W
R103	ERD10TJ222	C 2.2Kohm J 1/8W	R318	EVH0TAS20B14	CONTROL B 10Kohm
R104	EVN59UA00B53	CONTROL B 5Kohm	R319	ERD25TJ102	C 1Kohm J 1/4W
R105	ERD10TJ103	C 10Kohm J 1/8W	R320	ERD10TJ101	C 100ohm J 1/8W
R106	ERD10TJ101	C 100ohm J 1/8W	R321	ERD25TJ221	C 220ohm J 1/4W
R107	ERD10TJ682	C 6.8Kohm J 1/8W	R322	ERD10TJ682	C 6.8Kohm J 1/8W
R110	ERD10TJ272	C 2.7Kohm J 1/8W	R323	ERD10TJ221	C 220ohm J 1/8W
R111	ERD10TJ821	C 820ohm J 1/8W	R325	ERD10TJ221	C 220ohm J 1/8W
R112	ERD10TJ102	C 1Kohm J 1/8W	R327	ERD10TJ272	C 2.7Kohm J 1/8W
R113	ERD25FJ4R7	C 4.7ohm J 1/4W	R328	ERD10TJ272	C 2.7Kohm J 1/8W
R114	ERD10TJ271	C 270ohm J 1/8W	R329	ERD10TJ272	C 2.7Kohm J 1/8W
R115	ERD10TJ562	C 5.6Kohm J 1/8W	R330	ERD10TJ123	C 12Kohm J 1/8W
R116	ERD10TJ682	C 6.8Kohm J 1/8W	R332	ERD10TJ334	C 330Kohm J 1/8W
R151	ERD10TJ101	C 100ohm J 1/8W	R351	EVNK6AA00B53	CONTROL B 5Kohm
R152	ERD10TJ223	C 22Kohm J 1/8W	R352	ERD10TJ272	C 2.7Kohm J 1/8W
R153	ERD10TJ183	C 18Kohm J 1/8W	R353	EVNK6AA00B13	CONTROL B 1Kohm
R201	ERD10TJ102	C 1Kohm J 1/8W	R354	ERG1ANJ153H	M 15Kohm J 1W
R202	ERD10TJ181	C 180ohm J 1/8W	R355	ERC12GM272	S 2.7Kohm M 1/2W
R203	ERD10TJ682	C 6.8Kohm J 1/8W	R356	EVNK6AA00B53	CONTROL B 5Kohm
R204	ERG2ANJ390	M 39ohm J 2W	R357	ERD10TJ272	C 2.7Kohm J 1/8W
R205	ERD25TJ221	C 220ohm J 1/4W	R358	EVNK6AA00B13	CONTROL B 1Kohm
R206	ERG1ANJ331	M 330ohm J 1W	R359	ERG1ANJ153H	M 15Kohm J 1W
R207	ERD10TJ123	C 12Kohm J 1/8W	R360	ERC12GM272	S 2.7Kohm M 1/2W
R208	ERD25FJ4R7	C 4.7ohm J 1/4W	R361	ERD10TJ183	C 18Kohm J 1/8W
R209	ERD25TJ180	C 18ohm J 1/4W	R362	ERG1ANJ153H	M 15Kohm J 1W
R210	ERD10TJ331	C 330ohm J 1/8W	R364	ERC12GM105	S 1Mohm M 1/2W
R211	ERD10TJ472	C 4.7Kohm J 1/8W	R365	EVME6U10KB66	CONTROL B 6Mohm
R212	ERD10TJ222	C 2.2Kohm J 1/8W	R366	ERC12GM272	S 2.7Kohm M 1/2W
R302	ERD25TJ471	C 470ohm J 1/4W	R367	ERD25TJ472	C 4.7Kohm J 1/4W
R303	ERD10TJ821	C 820ohm J 1/8W	R368	ERD25TJ472	C 4.7Kohm J 1/4W
R304	EVN50AA00B13	CONTROL B 1Kohm	R369	ERD25TJ472	C 4.7Kohm J 1/4W
R305	ERD10TJ561	C 560ohm J 1/8W	R401	EVH0TAS20B14	CONTROL B 10Kohm
R306	ERD10TJ101	C 100ohm J 1/8W	R402	ERD10TJ682	C 6.8Kohm J 1/8W
R307	EWHNLA20B15	CONTROL B100Kohm	R403	ERD10TJ221	C 220ohm J 1/8W
R308	EWHNLA20B52	CONTROL B 500ohm	R404	ERD10TJ392	C 3.9Kohm J 1/8W
R309	ERD10TJ392	C 3.9Kohm J 1/8W	R405	ERD10TJ153	C 15Kohm J 1/8W
R310	EVN50AA00B13	CONTROL B 1kohm	R406	ERDS1TJ2R7	C 2.7ohm J 1/2W
R311	ERD10TJ473	C 47Kohm J 1/8W	R407	ERD10TJ560	C 56ohm J 1/8W
R312	ERD25TJ103	C 10Kohm J 1/4W	R408	EVN59UA00B32	CONTROL B 300ohm
R313	ERD10TJ561	C 560ohm J 1/8W	R409	ERD25TJ101	C 100ohm J 1/4W
R314	ERD25TJ681	C 680ohm J 1/4W	R410	ERD10TJ103	C 10Kohm J 1/8W
R315	ERD10TJ391	C 390ohm J 1/8W	R412	ERD10TJ332	C 3.3Kohm J 1/8W
			R414	ERD25TJ181	C 180ohm J 1/4W

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
R415	ERD10TJ681	C 680ohm J 1/8W	R622	ERD10TJ122	C 1.2Kohm J 1/8W
R416	ERD25TJ101	C 100ohm J 1/4W	R623	ERD10TJ681	C 680ohm J 1/8W
R501	ERD10TJ271	C 270ohm J 1/8W	R624	ERD10TJ101	C 100ohm J 1/8W
R502	ERD10TJ684	C 680Kohm J 1/8W	R625	EVN50AA00B54	CONTROL B 50Kohm
R503	ERD10TJ221	C 220ohm J 1/8W	R626	ERD10TJ473	C 47Kohm J 1/8W
R504	ERD10TJ102	C 1Kohm J 1/8W	R627	EVN50AA00B15	CONTROL B100Kohm
R505	ERD10TJ272	C 2.7Kohm J 1/8W	RB01	ERF3AK1R2	W 1.2ohm K 3W
R506	ERD10TJ101	C 100ohm J 1/8W	RB02	ERD10TJ103	C 10Kohm J 1/8W
R507	ERD10TJ223	C 22Kohm J 1/8W	RB03	ERD25FJ470	C 47ohm J 1/4W
R508	EVTK0CA00B23	CONTROL B 2Kohm	RB04	ERD10TJ684	C 680Kohm J 1/8W
R509	ERD10TJ222	C 2.2Kohm J 1/8W	RB05	ERDS1TJ273	C 27Kohm J 1/2W
R510	ERG2ANJ123	M 12Kohm J 2W	RB06	ERD50TJ105	C 1Mohm J 1/2W
R511	ERD25TJ561	C 560ohm J 1/4W	RB07	ERD50CKF4702	M 47Kohm F 1/2W
R512	ERD10TJ271	C 270ohm J 1/8W	RB08	EVNK6AA00B33	CONTROL B 3Kohm
R513	ERG1ANJ103H	M 10Kohm J 1W	RB09	ERD25CKF4701	M 4.7Kohm F 1/4W
R514	ERG2ANJ182	M 1.8Kohm J 2W	RB10	ERF3AK6R8	W 6.8ohm K 3W
R515	ERD10TJ1R5	C 1.5ohm J 1/8W	RB11	ERF20HMJ221	W 220ohm J 20W
R516	ERD2CJP3R3S	F 3.3ohm J 2W	RB12	ERD10TJ152	C 1.5Kohm J 1/8W
R517	ERQ12HKR68	F 0.68ohm K 1/2W		CAPACITORS	
R518	ERD10TJ223	C 22Kohm J 1/8W	C101	ECEA1HS3R3	E 3.3uF 50V
R519	ERD10TJ393	C 39Kohm J 1/8W	C103	ECKF1H103ZF	C 0.01uF Z 50V
R520	ERG1ANJ330H	M 33ohm J 1W	C104	ECKF1H103ZF	C 0.01uF Z 50V
R522	ERD10TJ681	C 680ohm J 1/8W	C105	ECKF1H103ZF	C 0.01uF Z 50V
R523	ERQ12AJ561P	F 560ohm J 1/2W	C106	ECKF1H103ZF	C 0.01uF Z 50V
R524	ERG1ANJ180H	M 18ohm J 1W	C107	ECKF1H103ZF	C 0.01uF Z 50V
R525	ERD25TJ681	C 680ohm J 1/4W	C108	ECEA1HS010	E 1uF 50V
R528	ERG1ANJ102H	M 1Kohm J 1W	C110	ECCF1H820JP	C 82pF J 50V
R535	ERD25CKF3241	M 3.24Kohm F 1/4W	C112	ECEA1HSR47	E 0.47uF 50V
R536	ERD25CKF3741	M 3.74Kohm F 1/4W	C113	ECEA1CS101	E 100uF 16V
R537	ERQ12HKR39	F 0.39ohm K 1/2W	C115	ECEA50ZR22	E 0.22uF 50V
R538	ERD10TJ682	C 6.8Kohm J 1/8W	C116	ECEA1CS100	E 10uF 16V
R539	ERD25TJ121	C 120ohm J 1/4W	C118	ECKF1H103ZF	C 0.01uF Z 50V
R601	ERD10TJ271	C 270ohm J 1/8W	C120	ECCF1H020CC	C 2pF C 50V
R602	ERD10TJ392	C 3.9Kohm J 1/8W	C121	ECCF1H330JC	C 33pF J 50V
R603	ERD10TJ183	C 18Kohm J 1/8W	C122	ECEA50Z1	E 1uF 50V
R604	EWHLNLA20B14	CONTROL B 10Kohm	C123	ECKF1H103ZF	C 0.01uF Z 50V
R605	ERD10TJ823	C 82Kohm J 1/8W	C124	ECEA1CS221	E 220uF 16V
R606	EWHLNLA20B14	CONTROL B 10Kohm	C125	ECEA1CS470	E 47uF 16V
R607	ERD10TJ224	C 220Kohm J 1/8W	C126	ECKD2H151KB2	K 150pF C 50V
R608	ERD10TJ123	C 12Kohm J 1/8W	C151	ECEA1HS2R2	E 2.2uF 50V
R609	ERD10TJ154	C 150Kohm J 1/8W	C152	ECCF1H120JL	C 12pF J 50V
R610	ERD10TJ152	C 1.5Kohm J 1/8W	C153	ECCF1H560JL	C 56pF J 50V
R611	ERD10TJ332	C 3.3Kohm J 1/8W	C154	ECKF1H103ZF	C 0.01uF Z 50V
R612	EVNK6AA00B14	CONTROL B 10Kohm	C158	ECKF1H103ZF	C 0.01uF Z 50V
R621	ERD10TJ273	C 27Kohm J 1/8W			

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
C201	ECQM1H473KZ	P 0.047uF K 50V	C413	ECKF1H472KB	C 4700pF K 50V
C202	ECQM1H104KZ	P 0.1uF K 50V	C501	ECEA1HS2R2	E 2.2uF 50V
C203	ECEA1HN010S	E 1uF 50V	C502	ECEA1CS100	E 10uF 16V
C204	ECEA1HS3R3	E 3.3uF 50V	C503	ECQM1H153KZ	P 0.015uF K 50V
C205	ECEA50Z10	E 10uF 50V	C504	ECQM1H473KZ	P 0.047uF K 50V
C207	ECQM1H473KZ	P 0.047uF K 50V	C505	ECQM1H153KZ	P 0.015uF K 50V
C209	ECEA1CS221	E 220uF 16V	C506	ECEA1HS2R2	E 2.2uF 50V
C210	ECEA1ES331	E 330uF 25V	C507	ECQK1682JZ	P 6800pF J 100V
C211	ECCF1H470J	C 47pF J 50V	C508	ECEA1CS101	E 100uF 16V
C212	ECCF1H470J	C 47pF J 50V	C509	ECEA2CS101	E 100uF 160V
C213	ECKF1H103ZF	C 0.01uF Z 50V	C510	ECKD2H103PE7	C 0.01uF P 500V
C214	ECEA1CS100	E 10uF 16V	C511	ECKD3D122JB8	C 1200pF J 2KV
C215	ECEA1CS101	E 100uF 16V	C512	ECQF2H274JZ1	P 0.27uF J 200V
C216	ECCF1H120JP	C 12pF J 50V	C513	ECEA1ES331	E 330uF 25V
C217	ECCF1H820JL	C 82pF J 50V	C514	ECEA1HS100	E 10uF 50V
C220	ECQM1H103KZ	P 0.01uF K 50V	C515	ECEA1CS220	E 22uF 16V
C221	ECKF1H103ZF	C 0.01uF Z 50V	C516	ECEA1ES101	E 100uF 25V
C222	ECEA1HS220	E 22uF 50V	C517	ECKD3D102JB8	C 1000pF J 2KV
C223	ECKF1H103ZF	C 0.01uF Z 50V	C518	ECKD3D102JB8	C 1000pF J 2KV
C224	ECKF1H103ZF	C 0.01uF Z 50V	C519	ECKD3D102JB8	C 1000pF J 2KV
C225	ECKF1H103PF	C 0.01uF Z 50V	C520	ECKD2H222KB2	C 2200pF K 500V
C301	ECCF1H121J	C 120pF J 50V	C523	ECKD2H222KB2	C 2200pF K 500V
C302	ECEA1CN100S	E 10uF 16V	C524	ECKD2H101KB2	C 100pF K 500V
C303	ECCF1H390J	C 39pF J 50V	C525	ECCD2H270K	C 27pF K 500V
C304	ECEA1ES4R7	E 4.7uF 25V	C531	ECEA1VS220	E 22uF 35V
C305	ECEA1CS100	E 10uF 16V	C601	ECCF1H560J	C 56pF J 50V
C306	ECCF1H101J	C 100pF J 50V	C602	ECKF1H103ZF	C 0.01uF Z 50V
C307	ECKF1H151KB	C 150pF K 50V	C603	ECQM1H223KZ	P 0.022uF K 50V
C308	ECKF1H151KB	C 150pF K 50V	C604	ECEA1HSR47	E 0.47uF 50V
C309	ECKF1H151KB	C 150pF K 50V	C605	ECKF1H272KB	C 2700pF K 50V
C310	ECCF1H680J	C 68pF J 50V	C606	ECEA1EN4R7S	E 4.7uF 25V
C351	ECKF1H391KB	C 390pF K 50V	C607	ECEA50ZR22	E 0.22uF 50V
C352	ECKF1H391KB	C 390pF K 50V	C608	ECEA50ZR1	E 0.1uF 50V
C353	ECKD3D681KB9	C 680pF K 2KV	C609	ECCF1H470JC	C 47pF J 50V
C354	ECKD3D681KB9	C 680pF K 2KV	C610	ECCF1H050CC	C 5pF C 50V
C401	ECQM1H273KZ	P 0.027uF K 50V	C611	ECEA16Z470	E 470uF 16V
C402	ECSZ25EF2R2N	T 2.2uF 25V	C801	ECKM2H103PE7	C 0.01uF P 500V
C403	ECSZ16EF3R3N	T 3.3uF 16V	C802	ECKM2H103PE7	C 0.01uF P 500V
C404	ECQM1H823MZ	P 0.082uF M 50V	C803	ECKM2H103PE7	C 0.01uF P 500V
C405	ECEA1HS010	E 1uF 50V	C804	ECKM2H103PE7	C 0.01uF P 500V
C406	ECEA25Z10	E 10uF 25V	C805	ECET2DR331SW	E 330uF 200V
C407	ECEA1ES101	E 100uF 25V	C806	ECEA2CS220	E 22uF 160V
C408	ECKF1H222KB	C 2200pF K 50V			
C409	ECEA1CS102	E 1000uF 16V			
C411	ECEA16Z100	E 100uF 16V		COILS	
C412	ECEA1HS3R3	E 3.3uF 50V			

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
L101	TLQR39N205C	Peaking 0.39uH	D511	TVSRD4.7EB2	Zener Diode 4.7V
L102	TLQR47N205C	Peaking 0.47uH	D512	MA27T-A	Diode
L103	TLQ047K205C	Peaking 4.7uH	D601	MA150	Diode
L201	TLQ100K205C	Peaking 10uH	D602	MA150	Diode
L301	TLK817	Delay Line	D603	MA150	Diode
L302	TLX330J176C	Peaking 33uH	D801	TVSERC0508	Diode
L351	TLT561K999G	Peaking 560uH	D802	TVSERC0508	Diode
L501	TLY15344F	Deflection Yoke	D803	TVSERC0508	Diode
L504	TLH15654P	H.Linearity Coil	D804	TVSERC0508	Diode
L601	TLQ180K205C	Peaking 18uH	D805	ERPF5B0M050F	Posistor
L602	TLT542K999G	Peaking 5.4mH	D806	TVSRM1ZM	Diode
L801	TLF6502F	Line Filter	TRANSISTORS		
L851	TLK159025N	Degauss Coil			
TRANSFORMERS			Q101	2SC1687	VIF Amp
T101	TLI81368-1	VIF Trans.	Q301	2SD636-R.S.T	Video Amp
T102	TLI63307-1	VIF Trans.	Q302	2SB641-R.S.T	Blanking
T151	TLI67394-1	VIF Trans.	Q303	2SD637-R.S.T	Video Drive
T201	TL63318-2	SIF Trans.	Q351	2SC1473-QNC	Video Out (B)
T202	ETA24Z31AY	Audio Out Trans.	Q352	2SC1473-QNC	Video Out (R)
T501	TLH15405	H.Drive Trans.	Q353	2SC1473-QNC	Video Out (G)
T502	TLF14630F	Flyback Trans.	Q501	2SC1573A-QNC	H. Drive
DIODES			Q502	2SD1171	H. Out
D201	0A90	Diode	Q503	2SD893-Q.R	+B Regulator
D301	MA150	Diode	Q601	2SD636-R.S.T	Q II-Lock Switch
D302	MA150	Diode	Q801	2SD1044A	+B Regulator
D303	MA150	Diode	Q802	2SC1473-QNC	Error Detector
D305	TVS152076	Diode	I.C.		
D306	TVS152076	Diode			
D307	TVSRD15EB2	Zener Diode 15V	IC101	AN5132	VIF.AGC.Det.AFT
D401	TVSRGP10J	Diode	IC201	AN5255	SIF.Audio.Output
D402	TVSRD13EB2	Zener Diode 13V	IC401	AN5436	H/V Osc. V Drive
D403	TVSRD2.7EB2	Zener Diode 2.7V	IC402	AN5512	V Drive. V Output
D404	MA27T-A	Diode	IC601	AN5312	Video. Chroma
D501	TVSRGP10J	Diode	FILTERS		
D502	TVS152076	Diode			
D503	MA26W0	Diode	X101	EFCH45MVZ2	Filter
D504	TVSRD12EBM	Zener Diode 12V	X201	EFC54R5M54E	Filter
D505	TVSRD11EB1	Zener Diode 11V	X601	TSS816M	Crystal
D506	MA26W0	Diode	SWITCHES		
D507	TVSRGP10J	Diode			
D508	TVSRD4.7EB2	Zener Diode 4.7V	S101	ESD1438	Antenna Switch
D510	TVSRH1	Diode	S151	TSE1453	AFT Switch
			S301	EVQR3AL13	Service Switch
			S601	TSE1453	Q II-Lock Switch
			S801	EVVON6F20A14	Full On Volume

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
	OTHERS			TSA338	UHF Antenna
	290KB22	Picture Tube		TSAB108-6Y	VHF Antenna
	EASBP47S	Speaker		TSX1195	Power Supply Cord
	EXNG102Z155	C-R Combination		TXAJT011110B	6P Coupl Kit-C03A
	EXNG102Z365D	C-R Combination		TXAJT031110B	2P Coupl Kit-C05A
	EXRP102K273S	C-R Combination		TXAJT041110B	2P Coupl Kit-C01A
	EXRP103P273S	C-R Combination		TXC5FD05	FM Trap Coil
	EXRP103P392S	C-R Combination		TXFJT021110B	3P Coupl Kit-C04A
	EXRP103P821S	C-R Combination		TXFKE011110B	Front Cabinet
	EXRP220K562S	C-R Combination		TXFKY011110B	Back Cabinet
	EXRP391K471S	C-R Combination		XANT322	Neon Lamp
	TBM37507	Model Name Plate		XBA1C08NU100	Fuse 125V 0.8A
	TBM37511	Service Plate		XBA1F30NU14A	Fuse 125V 3A
	TBX1553600	Front Cont. Knobs		XEH3B1A1	Earphone
	TBX1765500	Pull On Vol. Knob			
	TBX1774401	UHF Channel Knob			
	TBX1774501	UHF Indicator			
	TBX1787500A	AFT/QII-Lock			
	TBX643601	U/V Fine Tuning			
	TBX677402	VHF Channel Knob			
	THT945-2	CRT Mount Screw			
	TJB5304F	4P Lug-Terminal			
	TJC6319	Fuse Holder(L)			
	TJC6320	Fuse Holder(S)			
	TJS27980	Earphone Socket			
	TJS35090	CRT Socket			
	TLC2036	Convergence Yoke			
	TMM15207	CRT Socket Cap			
	TMM1551	CRT Rubber Spacer			
	TMM17538	DY Wedge			
	TMM6322	AC Cord Bracket			
	TNK36121EBT	UHF Tuner			
	TNP12953ZA	Circuit Board-C			
	TNP42188ZA	Circuit Board-S			
	TNP62878ZA	Circuit Board-A			
	TNP66525ZA	Circuit Board-K			
	TNT4681C	VHF Tuner			
	TPC192501	Packing Case			
	TPD151085	Cushion Top(R)			
	TPD151086	Cushion Top(L)			
	TPD152077	Cushion Bottom(R)			
	TPD152078	Cushion Bottom(L)			
	TPE24090	Set Cover			
	TQB611624	Fan Bag			